DKT. DB24NP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Stanley R. Krystek et al.
Serial No	:	Not yet known
Filed	:	May 10, 2001
For	:	MODIFIED INOSINE 5'-MONOPHOSPHATE DEHYDROGENASE POLYPEPTIDES AND USES THEREOF

35 No. Arroyo Parkway
Pasadena, California 91103
May 10, 2001

Assistant Commissioner for Patents
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SIR:

DECLARATION PURSUANT TO 37 C.F.R. §1.821(f)

I hereby declare that the content of the paper and computer readable copies of the Sequence Listings, submitted in the subject patent application in accordance with 37 C.F.R. §1.821(c) and (e), respectively, are the same.

Respectfully submitted,

Renato Marco P. Domingo

SEQUENCE LISTING

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<120> MODIFIED INOSINE 5'-MONOPHOSPHATE DEHYDROGENASE POLYPEPTIDES AND USES THEREOF

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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
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35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asp Lys
100 105 110

Thr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
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Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
340 345 350

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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Thr Pro
            100                 105                 110

Ile Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145                 150                 155                 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165                 170                 175
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Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
            180                 185                 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
        195                 200                 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
    210                 215                 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225                 230                 235                 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
                245                 250                 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
            260                 265                 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
        275                 280                 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
    290                 295                 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305                 310                 315                 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
                325                 330                 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
            340                 345                 350

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    370                 375                 380
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<400> 22

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            20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
    50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Pro
            100                 105                 110

Ser Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145                 150                 155                 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165                 170                 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
            180                 185                 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
        195                 200                 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
    210                 215                 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225                 230                 235                 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
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245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
340 345 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
355 360 365

Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe
370 375 380

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20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Ala
100 105 110

His Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

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Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
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Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
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Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
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Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Lys Pro
            100                 105                 110

Ile Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140
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Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
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Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
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Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35   40   45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
    50   55   60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65   70   75   80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85   90   95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ile Val
            100   105   110

Asp Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115   120   125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130   135   140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145   150   155   160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165   170   175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
            180   185   190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
        195   200   205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala

210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
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Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ala Leu
            100                 105                 110

Phe Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145                 150                 155                 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165                 170                 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
            180                 185                 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
        195                 200                 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
    210                 215                 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225                 230                 235                 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
                245                 250                 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
            260                 265                 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
        275                 280                 285
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Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
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Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
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Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
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Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
            340   345   350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
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Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe
    370   375   380

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            20   25   30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35   40   45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
    50   55   60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65   70   75   80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85   90   95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Pro
            100   105   110

Thr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
340 345 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
355 360 365

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Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe
    370                 375                 380
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<213> Homo sapiens

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gly Gly
            100                 105                 110

Tyr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145                 150                 155                 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165                 170                 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
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180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
340 345 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
355 360 365

Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe
370 375 380

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
 1               5                  10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
            20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
    50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gly Ser
            100                 105                 110

Gly Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr
        115                 120                 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp
    130                 135                 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile
145                 150                 155                 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr
                165                 170                 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg
            180                 185                 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala
        195                 200                 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala
    210                 215                 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val
225                 230                 235                 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
                245                 250                 255
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Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala
290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys
305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met
340 345 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln
355 360 365

Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe
370 375 380

<210> 30
<211> 384
<212> PRT
<213> Homo sapiens

<400> 30
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Gly Tyr Val Pro Glu Asp
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile
65 70 75 80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Phe Asp Lys
100 105 110

Thr Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp Lys Tyr
115 120 125

Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val Leu Asp
130 135 140

Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His Tyr Ile
145 150 155 160

Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val Val Thr
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly Leu Arg
180 185 190

Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val Met Ala
195 200 205

Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu Tyr Ala
210 215 220

Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln Thr Val
225 230 235 240

Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe
260 265 270

Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp
275 280 285

Ala Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser Glu Gly
290 295 300

Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln Asp Lys
305 310 315 320

Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His
325 330 335

```
Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg Ser Met
            340                 345                 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser Ala Gln
        355                 360                 365

Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg Leu Tyr
    370                 375                 380
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<210> 31
<211> 385
<212> PRT
<213> Homo sapiens

<400> 31

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
  1               5                  10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gly Ser
            100                 105                 110

Ser Trp Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
        115                 120                 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
    130                 135                 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
```

145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 32
<211> 385
<212> PRT
<213> Homo sapiens

<400> 32

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
  1               5                  10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gln Pro
            100                 105                 110

Gln Ser Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
        115                 120                 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
    130                 135                 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145                 150                 155                 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
                165                 170                 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
            180                 185                 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
        195                 200                 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
    210                 215                 220
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Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225   230   235   240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
                245   250   255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
            260   265   270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
        275   280   285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
    290   295   300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305   310   315   320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
                325   330   335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
            340   345   350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
        355   360   365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
    370   375   380

Phe
385

<210> 33
<211> 385
<212> PRT
<213> Homo sapiens

<400> 33
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
  1   5   10   15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
            20   25   30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
        35   40   45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Ile
100 105 110

Ile Pro Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 34
<211> 385
<212> PRT
<213> Homo sapiens

<400> 34
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Pro
100 105 110

Thr Gln Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys

```
        115                 120                 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
    130                 135                 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145                 150                 155                 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
                165                 170                 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
            180                 185                 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
        195                 200                 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
    210                 215                 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225                 230                 235                 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
                245                 250                 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
            260                 265                 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
        275                 280                 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
    290                 295                 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305                 310                 315                 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
                325                 330                 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
            340                 345                 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
        355                 360                 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
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370 375 380

Phe
385

<210> 35
<211> 385
<212> PRT
<213> Homo sapiens

<400> 35
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Thr Arg
100 105 110

Tyr Thr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 36
<211> 385
<212> PRT
<213> Homo sapiens

<400> 36
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ala Gly
100 105 110

Arg Pro Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 37
<211> 385
<212> PRT
<213> Homo sapiens

<400> 37
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr

85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Gly
100 105 110

Gln Tyr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala

```
            340                 345                 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
        355                 360                 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
    370                 375                 380

Phe
385
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<210> 38
<211> 385
<212> PRT
<213> Homo sapiens

<400> 38

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
  1               5                  10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Ser
            100                 105                 110

Pro Leu Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
        115                 120                 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
    130                 135                 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145                 150                 155                 160
```

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 39
<211> 385

<212> PRT
<213> Homo sapiens

<400> 39

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp
  1               5                  10                  15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
             20                  25                  30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Tyr Gly
            100                 105                 110

Thr Trp Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys
        115                 120                 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu
    130                 135                 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr
145                 150                 155                 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val
                165                 170                 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu
            180                 185                 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu
        195                 200                 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr
    210                 215                 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn
225                 230                 235                 240
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Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu
370 375 380

Phe
385

<210> 40
<211> 1155
<212> DNA
<213> Homo sapiens

<400> 40
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cagcagctct tcaactgcgg agacggcctc acctacaatg actttctcat tctccctggg 120
tacatcgact tcactgcaga ccaggtggac ctgacttctg ctctgaccaa gaaaatcact 180
cttaagaccc cactggtttc ctctcccatg gacacagtca cagaggctgg gatggccata 240
gcaatggcgc ttacaggcgg tattggcttc atccaccaca actgtacacc tgaattccag 300
gccaatgaag ttcggaaagt gaagaaatat gacaagaccc tgctgtgtgg ggcagccatt 360
ggcactcatg aggatgacaa gtataggctg gacttgctcg cccaggctgg tgtggatgta 420
gtggttttgg actcttccca gggaaattcc atcttccaga tcaatatgat caagtacatc 480
aaagacaaat accctaatct ccaagtcatt ggaggcaatg tggtcactgc tgcccaggcc 540
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<212> DNA
<213> Homo sapiens

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<211> 1155
<212> DNA
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<210> 43
<211> 1155
<212> DNA
<213> Homo sapiens

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<211> 1155
<212> DNA
<213> Homo sapiens

<400> 44
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<211> 1158
<212> DNA
<213> Homo sapiens

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gagaagcggc ttttctga 1158

<210> 46
<211> 1158
<212> DNA
<213> Homo sapiens

<400> 46
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<211> 1158
<212> DNA
<213> Homo sapiens

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<210> 48
<211> 514
<212> PRT
<213> Homo sapiens

<400> 48
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Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Asp Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile
65 70 75 80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Asn Phe Glu Gln
100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Ser His Thr Val Gly
115 120 125

Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile
130 135 140

Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val Thr Ser
145 150 155 160

Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser
165 170 175

Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val

180 185 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
195 200 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg
210 215 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ser
225 230 235 240

Gln Lys Gln Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp
245 250 255

Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val
260 265 270

Leu Asp Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His
275 280 285

Tyr Ile Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val
290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly
305 310 315 320

Leu Arg Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val
325 330 335

Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu
340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln
355 360 365

Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
370 375 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
385 390 395 400

Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
405 410 415

Leu Asp Ala Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser
420 425 430

Glu Gly Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln

435 440 445

Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
450 455 460

Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg
465 470 475 480

Ser Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser
485 490 495

Ala Gln Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg
500 505 510

Leu Tyr

<210> 49
<211> 514
<212> PRT
<213> Homo sapiens

<400> 49
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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Glu Gln
100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Lys Asp Arg Val Arg
115 120 125

Asp Val Phe Glu Ala Lys Ala Arg His Gly Phe Cys Gly Ile Pro Ile
130 135 140

Thr Asp Thr Gly Arg Met Gly Ser Arg Leu Val Gly Ile Ile Ser Ser
145 150 155 160

Arg Asp Ile Asp Phe Leu Lys Glu Glu Glu His Asp Cys Phe Leu Glu
165 170 175

Glu Ile Met Thr Lys Arg Glu Asp Leu Val Val Ala Pro Ala Gly Ile
180 185 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
195 200 205

Leu Pro Ile Val Asn Glu Asp Asp Glu Leu Val Ala Ile Ile Ala Arg
210 215 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ala
225 230 235 240

Lys Lys Gln Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp
245 250 255

Lys Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val
260 265 270

Leu Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys
275 280 285

Tyr Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val
290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala
305 310 315 320

Leu Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val
325 330 335

Leu Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu
340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln
355 360 365

Asn Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
370 375 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
385 390 395 400

Phe Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
405 410 415

Leu Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser
420 425 430

Glu Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln
435 440 445

Asp Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
450 455 460

Gln His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg
465 470 475 480

Ala Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser
485 490 495

Ala Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg
500 505 510

Leu Phe

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<211> 33
<212> DNA
<213> Homo sapiens

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<210> 51
<211> 37
<212> DNA
<213> Homo sapiens

<400> 51
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<210> 52
<211> 33
<212> DNA
<213> Homo sapiens

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<400> 53
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<210> 55
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<210> 58
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<210> 60
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<212> DNA
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aagcggagag ttatatttct tcactttccg aac 33

<210> 61
<211> 133
<212> PRT
<213> Homo sapiens

<400> 61
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Val Gly Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile
20 25 30

Pro Ile Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val
35 40 45

Thr Ser Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu
50 55 60

Leu Ser Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala
65 70 75 80

Gly Val Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys
85 90 95

Gly Lys Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile
100 105 110

Ala Arg Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys

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Asp Ser Gln Lys Gln
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<210> 62
<211> 514
<212> PRT
<213> Homo sapiens

<300>
<301> Gu, Jing Jin
      Spychala, Jozef
      Mitchell, Beverly S.
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      Dehydrogenase Type I Gene
<303> J. Biol. Chem.
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<305> 7
<306> 4458-4466
<307> February 14, 1997

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Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Gly Leu Thr Tyr
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Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu
         35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro
     50                  55                  60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile
 65                  70                  75                  80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                 85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Phe Glu Gln
            100                 105                 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Ser His Thr Val Gly
        115                 120                 125
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Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile
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Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val Thr Ser
145                 150                 155                 160

Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser
                165                 170                 175

Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val
            180                 185                 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
        195                 200                 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg
    210                 215                 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ser
225                 230                 235                 240

Gln Lys Gln Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp
                245                 250                 255

Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val
            260                 265                 270

Leu Asp Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His
        275                 280                 285

Tyr Ile Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val
    290                 295                 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly
305                 310                 315                 320

Leu Arg Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val
                325                 330                 335

Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu
            340                 345                 350

Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln
        355                 360                 365

Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
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Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
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Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
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Glu Gly Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln
435 440 445

Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
450 455 460

Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg
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Ser Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser
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Leu Tyr

<210> 63
<211> 514
<212> PRT
<213> Homo sapiens

<300>
<301> Collart, Frank R.
Huberman, Eliezer
<302> Cloning and Sequence Analysis of the Human and Chinese
Hamster Inosine-5'-monophosphate Dehydrogenase cDNAs
<303> J. Biol. Chem.
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<305> 30
<306> 15769-15772
<307> October 25, 1988

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35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Glu Gln
100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Lys Asp Arg Val Arg
115 120 125

Asp Val Phe Glu Ala Lys Ala Arg His Gly Phe Cys Gly Ile Pro Ile
130 135 140

Thr Asp Thr Gly Arg Met Gly Ser Arg Leu Val Gly Ile Ile Ser Ser
145 150 155 160

Arg Asp Ile Asp Phe Leu Lys Glu Glu Glu His Asp Cys Phe Leu Glu
165 170 175

Glu Ile Met Thr Lys Arg Glu Asp Leu Val Val Ala Pro Arg Ser Ile
180 185 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
195 200 205

Leu Pro Ile Val Asn Glu Asp Asp Glu Leu Val Ala Ile Ile Ala Arg
210 215 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ala
225 230 235 240

Lys Lys Gln Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp
245 250 255

Lys Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val
260 265 270

Leu Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys
275 280 285

Tyr Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val
290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala
305 310 315 320

Leu Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val
325 330 335

Leu Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu
340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln
355 360 365

Asn Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
370 375 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
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Phe Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
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Leu Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser
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Asp Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
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Gln His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg
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Leu Phe

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<213> Homo sapiens

<300>
<301> Dayton, Jennifer S.
Lindsten, Tullia
Thompson, Craig B.
Mitchell, Beverly S.
<302> Effects of Human T Lymphocyte Activation on Inosine Monophosphate Dehydrogenase Expression
<303> J. Immunol.
<304> 152
<306> 984-991
<307> 1994

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Gly Leu Thr Ala His Glu Leu Phe Ala Ser Ala Asp Gly Leu Thr Tyr
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Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu
        35                  40                  45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro
    50                  55                  60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile
65                  70                  75                  80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
                85                  90                  95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Phe Glu Gln
            100                 105                 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Ser His Thr Val Gly
        115                 120                 125

Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile
    130                 135                 140

Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val Thr Ser
145                 150                 155                 160
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Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser
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Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val
            180                 185                 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Thr Lys Lys Gly Lys
        195                 200                 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg
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Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ser
225                 230                 235                 240

Gln Lys Gln Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp
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Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val
            260                 265                 270

Phe His Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His
        275                 280                 285

Tyr Ile Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val
    290                 295                 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly
305                 310                 315                 320

Leu Arg Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val
                325                 330                 335

Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu
            340                 345                 350

Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln
        355                 360                 365

Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val
    370                 375                 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr
385                 390                 395                 400

Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser
                405                 410                 415
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Leu Asp Pro Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser
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Glu Gly Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln
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Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile
450 455 460

Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg
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<300>
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<302> Two Distinct cDNAs for Human IMP Dehydrogenase
<303> J. Biol. Chem.
<304> 265
<305> 9
<306> 5292-5295
<307> March 25, 1990

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Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro

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Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile
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Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Asn Phe Glu Gln
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Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile
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Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser
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Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val
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Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys
195 200 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg
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Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val
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Phe His Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His
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Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly

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Pro Gln Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg
500 505 510

Leu Tyr